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or the other.——C. B. Clarke's paper in the July *Journal of Botany*, "Notes on Commelinaceæ," is very interesting as containing a summary of the order as it is to appear in the forthcoming volume of De Candolle's "Monographies." In the same journal, J. G. Baker catalogues the ferns collected by Kalbreyer in New Granada, and describes twenty-one new species.——J. B. Ellis, in the July *Torrey Bulletin*, describes eleven new species of Fungi from Utah, collected by M. E. Jones.——A notice of the Muhlenberg Herbarium, now in possession of the American Philosophical Society in Philadelphia, and a continuation of the List of the State and local floras of the United States, occur in the same number of the *Bulletin*.——Dr. Rothrock's paper on "Home and foreign methods of teaching Botany," in the July *Botanical Gazette*, is one which should be read by every teacher of botany in the country. It contains a strong plea for *the study of plants rather than books*. In the same number Dr. Engelmann describes several new species of plants, among them a suffrutescent Portulaca. C. H. Peck also describes some new Fungi from Utah. ——C. F. Wheeler and E. F. Smith, of Hubbardston, Mich., have just issued a "Catalogue of the Phænogamous and vascular Cryptogamous plants of Michigan." It contains entries of 1634 species, of which 1559 are flowering plants. Valuable notes are appended to many of the species, and a good map of the State is added. The authors offer a limited number of copies of this valuable catalogue for sale at fifty cents each.——Dr. E. L. Sturtevant, well known for his many important contributions to economic botany, has just added another, "The growing of Indian Corn," a pamphlet of fifty pages, extracted from the Twenty-eight report of the Massachusetts State Board of Agriculture.

ZOÖLOGY.

A SHOWER OF CYCLOPS QUADRICORNIS.—I have just received (June 12) from C. L. Garretson, of Salem, Henry county, Iowa, a small vial containing about half a teaspoonful of water, accompanied by a note in which he says, "On the night of June 8, 1881, there was a heavy rain-fall, and on the morning of the 9th the ground was covered, in places, with something that looked like blood. I found that they were living creatures, and with a spoon took up a pint of the muddy water containing them."

Upon examining the sample received, I found it to be swarming with *Cyclops quadricornis*, or what I take to be that species. The only thing peculiar about them, is, that the body is full of bright red corpuscles, which accounts for their imparting a red appearance to the water containing them. A specimen of the same creature taken from a jar of water that has been standing in my office for several weeks, contains a few of these corpuscles, but not a hundredth part as many as are in the bodies of the rain-water specimens. While it might not be considered remarkable that a few of these animals should be found in pools of rain-water, I am puzzled to understand how they came here in such immense numbers, unless we suppose that they were distributed through the whole body of rain that fell, and were afterwards concentrated by the draining away of the surplus water. There were not less than five hundred in the sample of water sent me, of which about one-third were alive when received, after having been tightly corked for several days.—*F. E. L. Beal.*

MUSSEL AND INSECT CLIMBERS.—In *Psyche*, Vol. III, No. 80, just issued, Victor Tousey Chambers states an interesting fact regarding the minute larva of the Tineid, *Aspidisca saliciella* Cham. He says the method by which it climbs a tree or weed, " is one of the most surprising in the insect world." The larva is footless, nor does it gain a foothold by the exudation of any glutinous, or other secretion; yet encumbered by its case, it climbs trees, fences, &c. " The larvæ travel solely by their silk. Successive taps are given with the end of the spinneret to the surface on which the larva lies, thus a minute byssus is formed, to which the spinneret adheres, the body is then contracted, so that the under surface of the case is attached. The head and segments are again extended, and another byssus is made, and the body contracting, the case is again brought up and attached. Its attachment is only by a few silken threads, each of which is less than 0.0002^{mm} in diameter, and the fresh silk readily stretches or breaks. This is the sole mode of progress of the larva."

I have thought it would add to the interest of the above, to ask the reader to compare it with our account of the mode of perpendicular climbing as practiced by the black mussel, *Mytilus edulis*, in AMERICAN NATURALIST, Vol. IV, 1871, p. 331. As there described, the climbing of this mollusk is almost identical with that of the larval Tineids described by Chambers. The operations of the mussel being on a larger scale were easily observed, hence each step in the process is given. The figure of the mussel, is, by an unfortunate misunderstanding of the printer, placed wrong. The umbo, or pointed end of the shell, should be down, and the nib, or open end, should be up. Then against the three sets of byssus let the imagination put the perpendicular side of a rock, and we have the animal in climbing position. My object in not drawing the rock was simply to save expense in engraving.—*Samuel Lockwood, Freehold, N. J., May, 1881.*

A WOODCHUCK CLIMBS A TREE.—About two years ago a young man who was living with me, came in one day saying that he had just seen a small animal, possibly a raccoon, ascending a tree in the woods some sixty rods away. Taking my shot-gun, I went to the place, where I soon saw the creature in the top of a black oak tree, almost forty feet from the ground. The animal seemed very cunning, and managed for some time to keep on the opposite sides of some of the larger limbs, but I finally got a shot at him. He came to the ground with a bounce, when I found it was a woodchuck. It was but slightly wounded in one of the fore legs, and I captured it and took it home. I put it in a hollow tree near my residence, and it remained there a couple of weeks, freely eating the corn which I regularly fed it. But one night it emigrated, and I saw it no more. These animals are not plentiful in this region, indeed in a residence here of twenty-four years, I have only seen one other specimen, though occasionally hearing them mentioned. Until this incident, I did not know that they ever ascended such tall trees.—*Charles Aldrich, Webster City, Iowa, June 9, 1881.*

CARPHOPHIOPS HELENÆ IN INDIANA.—This species of serpent was originally described from specimens obtained at Monticello, Miss., and in Southern Illinois. I have a specimen that was captured by Mr. Charles Jameson, of Indianapolis, in Brown county, Indiana. The locality is about forty miles south of Indianapolis. —*O. P. Hay.*

EUTÆNIA RADIX IN INDIANA.—In the Museum of Butler University there is a good and well characterized specimen of *Eutænia radix*, that I have every reason to believe was found at Irvington, near Indianapolis. The species is found at Bloomington, Illinois, and is included, by Dr. W. H. Smith, in his "Catalogue of the Reptiles and Amphibians of Michigan," as occurring in that State.—*O. P. Hay, Butler University, June 15.*

HABITS OF THE YELLOW-BELLIED WOODPECKER.—I found, at Buckfield, Maine, early in July, a yellow-bellied woodpecker's nest, and with it collected a large section of a white birch tree that shows their marks in vertical instead of horizontal rows, and is a proof that they eat the sap if not also the bark. The humming-birds were very thick around the tree, sucking the sap where it was running from the holes; there were also butterflies and moths around it. The nest was very peculiar, being placed on the north side of a tall poplar.—*H. C. Bumpus.*

PROBABLE CAUSE OF THE LONGEVITY OF TURTLES.—So far as we are aware, no attempt has been made to explain the unusual longevity of turtles, whose lives, as is well known, span over a century. There appears to be no longer-lived animals than these beings of slow gait and slow manner of life. The following facts may throw light on the cause of their great age. In the first place they are protected by their solid shell from the attacks of snakes, fishes and birds; young turtles, we are informed by Professor J. W. P. Jenks, are sometimes carried off by herons, but in adult life they are probably rarely eaten by other animals. Has any one ever found any empty turtle shells? As some turtles lay but two or three eggs a year, nature seems to have counted upon an immunity from the ordinary evils of childhood in these animals. It is probable that the larger proportion of, indeed most, young turtles when hatched survive, and when two or three years old, are fitted to resist successfully ordinary fish and avian enemies. They are not exposed to vicissitudes of weather; the fact that the period of egg-laying (in New England from June 10–20) is so constant, and varies so little at different seasons, shows that they are hardy and tough. Finally, the persistence of the type of gigantic tortoises on the Galapagos islands, indicate the wonderful vitality of this type of life in resisting prolonged climatic and geological changes.—*A. S. Packard, Jr.*

THE TRICHINA AND OTHER ANIMAL PARASITES.—Renewed attention has been drawn to the Trichina. According to the *Penn Monthly*, Dr. Leidy has recently stated that this parasite was first discovered by an English surgeon in 1833, but its presence in pork was first detected by Dr. Leidy himself in 1840. He reminds the public for their comfort: 1st, that all food animals are liable to have parasites, and that the tape-worm is sometimes conveyed in rare beef; 2d, that only one hog in about ten thousand is infected with trichinæ; and, 3d, that thorough cooking will kill all such parasites, while none of them are poisonous after a good cooking. He believes that the Mosaic prohibition of pork was due to the danger of trichinosis, in a country where fuel was scanty, and, therefore, their food seldom well cooked. He thinks that millions may have died of trichinosis in the centuries before the true source of the danger was discovered, and that many of the deaths which occurred in the army during the Civil War were due to the frequent use of raw and badly cooked pork, although ascribed to typhoid, rheumatic or malarial fevers.

For a general account of the trichina and allied parasites we would refer the reader to an excellent book[1] published a few years ago by Professor Van Beneden, a Belgian naturalist, who, by the way, was the first to discover the history of the transformations of the tape-worm. Van Beneden divides animal parasites into several categories. The first are free messmates, which only live as boarders or *commensals* in the bodies or in intimate relations with other animals, such as hermit crabs, the pilot fish, Remora, etc.; second, the fixed messmates, as barnacles, etc.; third, mutualists, such as a certain louse of the dog, which harbors a larval tænia; and lastly parasites, which include leeches, lice, fleas, ticks, ichneumon flies, and finally the genuine parasites, such as the tape-worm and trichina, which migrate from one host to another in order to complete their metamorphoses. It is the cheapest, most reliable and best illustrated work of the kind we have seen.

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[1] Animal Parasites and Messmates. By Professor P. J. Van Beneden. With 83 illustrations. The International Scientific Series. New York: D. Appleton & Co. 1876. 12mo, pp. 274.

THE TAIL IN THE HUMAN EMBRYO.—This is a subject of considerable interest in view of the occasional statements regarding tailed races of men in the interior of Africa, and of the supposition that the human embryo has a tail homologous with that of the monkeys, and that, therefore, in this respect, man passes through a monkey-stage, as insisted upon by Haeckel, who remarks in his "History of Creation," Vol. I, p. 308, "Now, man in the first months of development possesses a real tail as well as his nearest kindred, the tailless apes (orang-outang, chimpanzee, gorilla), and vertebrate animals in general. But, whereas, in most of them—for example the dog, it always grows longer, in man and in tailless *mammals, at a certain period of development*, it degenerates and finally completely disappears. However, even in fully developed men, the remnant of the tail is seen in the three, four or five tail vertebræ (vertebræ coccygae) as an aborted or rudimentary organ, which forms the hinder or lower end of the vertebral column." Now this notion is rudely disputed by Professor His, who contradicts in a paper on this question (abstracted in the Journal of the Royal Microscopical Society) the assertion that at a certain stage in its development the human embryo has a true tail, which is afterwards absorbed. As to the definition of a tail, Professor His considers that the caudiform or tail-like prolongation is a true tail when, extending beyond the cloaca, it contains a number, greater or less, of supernumerary vertebræ. Without this condition there is merely a caudiform appendage. His knows of no well-authenticated case of supernumerary vertebræ in the human embryo, and pathological observation he believes to coincide with embryological knowledge in justifying the assertion that in man the normal number of thirty-four vertebræ is never exceeded.

Prof. His' paper appeared in 1880; the same year, however, Dr. Leo Gerlach published in Gegenbaur's Morphologisches Jahrbuch (Band VI, Heft. I.) a paper on a case of tail-formation in a human embryo. He refers to a case of the occurrence of a tail in an abnormal embryo described in 1840 by Dr. Fleischman. On holding the fœtus up to the light there appeared, in the first third of the eight-lines-long tail, five dark points through the thin skin, which he regarded as vertebræ, the continuation of a spine. The end of this tail seemed to be skinny, and was very delicate and transparent. This embryo forms the subject of Gerlach's exhaustive anatomical account before us. The embryo is 10.8 centimeters (four inches) long and was in the early part of the fourth month of embryonic life. The free portion of the tail is 12^{mm} in length; it is long and slender, being in length equal to that of the foot of the embryo. In this tail a well-marked notochord is present. The organ, therefore, should be regarded as the homologue of a genuine tail, and Gerlach considers it as a case of atavism, and that it represents an earlier phylogenetic condition. He thinks, for reasons which he assigns, that at an earlier embryonic date there were a longer notochord, a longer medullary tube and a greater number of primitive or proto-vertebræ. In an embryo a few weeks older, on the other hand, the notochord would entirely disappear. Haeckel's view, therefore, is, so far as one abnormal example is concerned, apparently sustained against that of His.

NEW TYPE OF PARASITIC CRUSTACEAN.—A new parasitic Cirriped (*Laura*) has been discovered by Lacaze-Duthiers, according to the Journal of the Royal Microscopical Society, living as an Antipatharian coral (*Gerardia*). Externally it is kidney-shaped, and its body, composed of twelve segments with six pairs of limbs, is imbedded in the soft parts of the coral; it is a little over a centimeter long, with a carapace formed of two scales or valves united along the median line, and is from two to four times as long as the body. The carapace is hard externally with a soft internal layer; between these there is lodged the liver and one of the genital glands, together with a very rich vascular plexus. The external covering is riddled by a large number of small ducts, the outer orifices of which are covered by a membrane, which is surrounded by delicate filaments; these are of a cartilaginous consistency, and have a central duct. A study of the circulatory organs shows that the tissues on the inner face of the carapace are supplied with a rich capillary plexus, which surrounds all the organs, and gives rise to nutrient lacunæ. These communicate with the internal orifices of the canals, so that we may say that Laura gives off thousands of radicles, which force their way into the tissues of the coral. The peculiar arrangement of the digestive system confirms this view. As regards this, the liver is of great size, the digestive tube is a closed sac, with no mouth or vent, and is always full of a yellow, pultaceous matter, which appears to be similar to the hepatic secretion.

The food is absorbed by the walls of the carapace, the absorbed products are purified by the biliary secretion, which here at any rate appears to have a depuratory function. The ovary and testes occur in the same individual. The young are born in the Nauplius condition.

CILIA AND POSSIBLE NERVOUS SYSTEM OF INFUSORIA.—In a recent essay on cilia, Prof. J. W. Engelmann, referring to the Infusoria, says that notwithstanding the very high specialization of these "unicellular" organisms, he could not detect among them intracellular fibers subtending the cilia, such as those which occur in the ciliated epithelium of Lamellibranchs. Of this kind are not the muscular striæ of Stentor, alleged by Simroth to be in connection with the cilia beneath which they course. This connection Engelmann could not confirm. Certain it is that the ciliary movements of Stentor are independent of the general contractions of the body.

Do the Infusoria possess an approximation to the nervous system of the higher animals? It was thought by the late Professor H. J. Clark (see his "Mind in Nature") that the higher Infusoria had a nervous system or something analogous to it. Engelmann now says (Journal of the Royal Microscopical Society for April) that the Infusorian, *Stylonychia mytilus*, has unquestionably a system of ventral fibers trending from near the middle line, beneath the ectoplasm, to the two conspicuous series of large admarginal cilia, which aid so powerfully the motions of this huge animalcule. But these fibers are not like the fibers of ordinary ciliated cells, nor are the lashes which they supply cilia, properly so called. The lashes are complex appendages, remote from one another, moving independently under the control of their possessor. Each has its own fiber, which is pale, soft, homogeneous, and not more than 0.2μ across. The fibers are parallel and so delicate that they can only be seen for a short time in specimens starved during some hours in filtered water, and then killed in osmic acid. Are not these fibers truly nerves? Why, asks Engelmann, should not the higher Infusoria possess a nervous system? May not more exact researches soon decide this question in the affirmative? Has not *Panophrys flava* eyes? If not so what is the function of the watch glass-shaped organ with its pigment-spot?

New Genera of Cuttle Fishes.—In the Transactions of the Danish Academy of Science, Professor Steenstrup describes two interesting genera allied to Sepia, under the name of *Sepiadarium kochii* and *Idiosepius pygmæus*. They inhabit the Indian ocean. One of the arms of the 4th ventral pair in the males is adapted to serve as a fertilizing organ (a hectocotyle), the female receiving the spermatophores on the internal face of the buccal membrane. The distinguished author closes his memoir with a comparative view of all the known genera of Myopsidan cephalopods.

Note regarding change of color in Diaptomus sanguineus.—I visited the Glendale pond July 27th, and found thick swarms of this Copepod. Only a few had egg-sacs, and no male was found; while the females were not red, but bluish. The antennæ had remained red, also the furca, but the postabdomen was yellow, and the body and legs bluish.—*C. F. Gissler.*

New Discoveries concerning Deep-sea Crustacea of the Gulf of Mexico.—Additional information of a good deal of interest has since our last note on this subject been published by A. Milne Edwards. From an abstract in the *Journal* of the Royal Microscopical Society, it appears that forty new generic types were discovered, while certain groups which had been supposed to be absent from the American seas are very richly represented at these great depths. Crabs proper disappear below 500 meters from the surface: at 800 meters, however, there was found Bathyplax, which takes the place of Gonoplax of the French coast, but it is blind. Representatives of Willemoesia were found at 3500 meters, and these too were blind.

The infinite variety of the forms is, however, the most astonishing point, transitional types abound, and groups hitherto regarded as very distinct are now linked by intermediate forms. As examples, the author cites the Paguridæ, generally placed among the Anomura, and which have as yet had no link uniting them to the Macrura; now there is *Pylocheles agassizii*, in which the abdomen is not soft and asymmetrical, but is formed of solid regular rings, and terminated by swimmerets. This creature lives in holes, which it closes by means of its claws. *Mixtopagurus* has the abdomen more developed on the right than on the left side, and divided into seven segments, of which the last two are alone large and hard. There are some curious adaptive modifications: *Eupagurus discoidalis*, which lives in the tubular shells of Dentalium, has one of its claws spherical. Xylopagurus lives in holes in wood, and has its abdomen converted into an operculum for covering one of the two holes of its retreat. Similar connecting links were found between the Dromidæ and the Homolidæ, and on the whole the author concludes that submarine explorations will aid palæontological investigations in gradually filling up the lacunæ now existing in zoölogical systems.

THE MUSK SHEEP.—In Dr. Bessel's account of the North Pole expedition published in German, and noticed in *Nature*, valuable accounts of this animal are given. None of those killed by the members of the expedition had a very marked musk smell. The author is uncertain whether this peculiarity is to be attributed to the very high latitude in which they were obtained, or to their having been killed out of the breeding season. No difficulty was found in distinguishing the tracks of these animals from those of reindeer, although some former observers have not found this easy. In all the herds there are from ten to twenty cows to one bull. Their whine is somewhat like the snorting of the walrus, and never resembles in the least the cry of the goat or the sheep. When danger approaches they never give signal with their voice, but only by stamping or striking their neighbor with their horns. They have dire combats with bears sometimes, and often come off victors.

ZOOLOGICAL NOTES.—The organization of an Echiurus-like Sipunculoid worm (*Thalassema mœbii* Greef), has been studied by Greef, who regards the anal pouches of the Echiuri as branchiæ comparable to the aquiferous lungs of Holothurians.—— The organs of taste in the Heteropod mollusks are considered by Professor Todaro to have the same structure as in mammals. They are arranged in two or three rows on each side of the mouth cavity, or externally on the proboscis of Pterotrachea. They are little papillæ with internal sense-cells situated next to the termination of the nervous fibrilla, while externally they each carry a long sensitive hair, and the different sensitive hairs of these cells traverse the canal of the cuticular layer, and arrive at the level of the gustatory pore.——In the Annals of the New York Academy of Sciences, Mr. R. E. C. Stearns publishes a paper on the existence of a colony of *Helix aspersa* in California, which was planted twenty-three years ago at San José. He also remarks on the geographical distribution of certain West American land-snails, and corrects previous errors concerning them.——In *Nature*, Mr. W. A. Herdman collects the evidence brought forward by Charles Julien, which shows strong ground for the belief that the little understood " neural gland " in the Ascidians, represents the glandular portion of the *hypophysis cerebri*, or pituitary body of vertebrates.——At a recent meeting of the Royal Society of London, Professor W. K. Parker, in a paper on the structure and development of the skull in sturgeons, remarks in closing, that the sturgeons as a group cannot be said to lie directly between any one family of the Selachians and any one family of the bony Ganoids, yet, on the whole, that is their position; the bony Ganoids, on the whole, approach the Teleostei, especially such forms as Lepidosteus and Amia, which have lost their " spiracle," and in other points are less than typical, as Ganoids. Larval sturgeons are, in appearance, miniature sharks; for a few weeks they have a similar mouth, and their lips and throat are beset with true teeth that are molted before calcification has fairly set in. Their first gills are very long and exposed, but not nearly so long, or for such a time uncovered, as in the embryo of sharks and skates.

A CORRECTION.—On pp. 585 and 586 of the July NATURALIST, a serious inadvertency occurs. In the list of strictly fresh-water shells is mentioned *Helicina occulta* (by typographical error printed *oculata).* Though Helicina is not a pulmonate, the species here indicated is strictly terrestrial in its habit. The reader will therefore refer it to the preceding list of land shells, where the intention was to have placed it.—*R. Ellsworth Call.*

ENTOMOLOGY.[1]

THE CULTIVATION OF PYRETHRUM AND MANUFACTURE OF THE POWDER.[2]—*The use of Pyrethrum as an Insecticide.*—Up to a comparatively recent period the powder was applied to the destruction of those insects only which are troublesome in dwellings, and Mr. C. Willemot seems to have been the first in the year 1857 (?) to point out its value against insects injurious to agriculture and horticulture. He goes, however, too far in his praise of it, and some of his statements as to its efficacy are evidently not based upon actual experiment. Among others he proposes the following remedy: " In order to prevent the ravages of the weevil on wheat fields, the powder

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[1] This department is edited by Professor C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.

[2] Continued from July number.